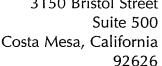
3150 Bristol Street





FAX 714-513-1278 714-513-1415

January 28, 2000

Lockheed Martin Corporation West Coast Project Office 2550 N. Hollywood Way, 3rd Floor Burbank, California 91505

Attention:

Mr. Eric Hodder

**Project Coordinator** 

Subject:

December 1999 Data Report Water Supply Contingency Plan Production Well Sampling Program Crafton-Redlands Plume Project

Dear Mr. Hodder:

This report presents a summary of results of the Water Supply Contingency Plan production well sampling for the month of December 1999. The Water Supply Contingency Plan (WSCP) was prepared by Lockheed Martin Corporation and submitted to the State of California Regional Water Quality Control Board (RWQCB) Santa Ana Region on September 30, 1996. The plan was conditionally approved by the RWQCB in a letter dated March 6, 1997. The WSCP for the Crafton-Redlands Plume was prepared to address maintenance of water supply to purveyors in the event that wells became impacted with trichloroethene (TCE) from the Crafton-Redlands TCE Plume. A summary of key dates and WSCP sampling program evolution is provided on Table 1.

The locations of the WSCP wells and analytical results for the December 1999 sampling event for TCE and perchlorate are shown on Figures 1 and 2, respectively. Table 2 presents a summary of analytical tests performed on each WSCP well and water system sampling point. The sampling frequency of each well is once a month for the first year. An alternate frequency, if required, is based on the analytical results as outlined in the WSCP TCE and perchlorate decision matrices, provided as Figures 3 and 4, respectively. The perchlorate decision matrix was presented in the Perchlorate Work Plan and Schedule, which was submitted, to the RWQCB on August 15, 1997. The RWQCB approved the Perchlorate Work Plan on October 31, 1997. Table 3 presents a summary of the wells sampled twice monthly according to the decision matrices.

#### **RESULTS**

A summary of the analytical results for the December 1999 WSCP sampling event for TCE and perchlorate is shown on Figures 1 and 2, respectively, and presented on Table 4. Available groundwater elevation data is provided on Table 5. The water sampling field forms are provided in Attachment A. Chain-of-custody, laboratory data sheets, and Level III Modified laboratory quality assurance/quality control (QA/QC) documentation is provided in Attachment B. During the month of December 1999, the City of Loma Linda (COLL) Mountain View #3 and the new Gage 98-1 wells were added to the monthly WSCP sampling program for TCE and perchlorate.

#### Trichloroethene

Three groundwater samples collected in December met or exceeded  $2/5^{th}$  the MCL for TCE (2.0  $\mu g/L$ ) including: Gage 26-1 (7.1  $\mu g/L$ ), Gage 27-1 (5.6  $\mu g/L$ ), and COLL Richardson #2 (3.2  $\mu g/L$ ). Gage 26-1 and Gage 27-1 were placed into TCE treatment in May 1999; therefore, they will be sampled once a month.

The TCE impacts observed at Gage 29-2 and Gage 29-3 are partially attributed to the Norton AFB plume and partially attributed to the Crafton Redlands plume, thus Gage 29-2 and Gage 29-3 are sampled twice a month for TCE when active. In December Gage 29-2 and Gage 29-3 were off-line and not sampled.

The COLL Richardson Blend sampling point was not sampled in December because during the month of December, only the Richardson #3 well was pumping into the Richardson system. Thus, sampling of Richardson Blend was considered redundant.

#### Perchlorate

Two groundwater samples collected in December met or exceeded 75 percent (13.5  $\mu g/L$ ) of the PAL for perchlorate including: Gage 92-1 (15  $\mu g/L$ ) and COLL Richardson #2 (42  $\mu g/L$ ). Gage 29-2, Gage 29-3, Gage 51-1, and COLL Mountain View #2 wells are currently being sampled on a twice a month basis for perchlorate, if active. Gage 29-2, Gage 29-3, and Gage 51-1 were off-line in December and thus were not sampled.

The December 2, 1999 sample collected from Gage 92-1 had a perchlorate concentration that exceeded 75 percent of the PAL. In accordance with the perchlorate decision matrix (Figure 3), a confirmation sample was collected on December 20, 1999. The confirmation sampling result also exceeded 75 percent

of the perchlorate PAL, thus, beginning in January 2000, Gage 92-1 will be sampled twice monthly for perchlorate.

The perchlorate impacts observed at COLL Richardson #2 are consistent with historic data when the well is sampled shortly after the well is turned on. As stated above, water from Richardson #2 was not pumped into the system and therefore a confirmation sample was not collected. The COLL has no immediate plans for using the Richardson #1 and Richardson #2 wells. When COLL resumes operation of these wells, and the water is pumped into the system, the wells will be operated in accordance with DHS-approved perchlorate-blending plan.

#### TWICE-MONTHLY SAMPLING EVALUATION

In accordance with the TCE and perchlorate decision matrices provided as Figures 3 and 4, respectively, an evaluation is made every three months on the wells sampled on a twice monthly basis. If the average TCE concentration in a well over the three month period is less than  $2/5^{th}$  of the MCL (2.0  $\mu g/L$ ) the well will be sampled once a month for TCE. Similarly, if the average perchlorate concentration in a well over the three month period is less than 75 percent of the PAL (13.5  $\mu g/L$ ) the well will be sampled once a month for perchlorate.

A summary of the three-month sampling cycle for TCE and perchlorate from October 1999 through December 1999 is provided below.

#### Trichloroethene

Beginning in October 1999, two wells (Gage 29-2 and Gage 29-3) are sampled on a twice a month basis, if active. For the past three months (October 1 through December 31, 1999), the average TCE concentration for the wells sampled on a twice-monthly basis is presented on Table 6.

One sample was collected from Gage 29-2 during the October 1 through December 31, 1999 sampling cycle because the well was off-line for most of the three month sampling cycle. The TCE concentration for the one sample collected from Gage 29-2 is 4.0  $\mu$ g/L (Table 6). This exceeds 2/5<sup>th</sup> the MCL for TCE (2.0  $\mu$ g/L), thus, Gage 29-2 will continue to be sampled on a twice-monthly basis, if active.

No samples were collected from Gage 29-3 during the October 1 through December 31, 1999 three-month sampling cycle because the well was off-line. Gage 29-3 will continue to be sampled on a twice-monthly basis, if active.

Twice-monthly sampling for TCE will continue for Gage 29-2 and Gage 29-3. At the conclusion of the next three month sampling cycle (March 31, 2000), the TCE

concentrations in Gage 29-2 and Gage 29-3 will be evaluated to determine the future sampling frequency.

#### Perchlorate

As of December 1999, four wells (Gage 29-2, Gage 29-3, Gage 51-1, and COLL Mountain View #2) are sampled on a twice a month basis, if active. For the past three months (October 1 through December 31, 1999), the average perchlorate concentrations for the wells sampled on a twice-monthly basis are presented on Table 6.

One sample was collected from Gage 29-2 during the October 1 through December 31, 1999 sampling cycle because the well was off-line most of the time. The perchlorate concentration for the one sample collected from Gage 29-2 is 20  $\mu$ g/L (Table 6). This exceeds 75 percent of the perchlorate PAL, thus, Gage 29-2 will continue to be sampled on a twice-monthly basis, if active.

No samples were collected from Gage 29-3 during the October 1 through December 31, 1999 three-month sampling cycle because the well was off-line. Gage 29-3 will continue to be sampled on a twice-monthly basis, if active.

Three samples were collected from Gage 51-1 during the October 1 through December 31, 1999 three-month sampling cycle. The average perchlorate concentration for the collected samples was 14.7  $\mu$ g/L (Table 6) thus, Gage 51-1 will continue to be sampled on a twice-monthly basis, if active.

A total of six samples were collected from the COLL Mountain View #2 between the October 1 and December 31, 1999. The average perchlorate concentration for the six samples analyzed from COLL Mountain View #2 is 9.0  $\mu$ g/L (Table 6). During the past three-month sampling cycle the average perchlorate concentration in Mountain View #2 was below 13.5  $\mu$ g/L (75 percent of the PAL). In accordance with the WSCP decision matrix for perchlorate, Mountain View #2 should be sampled once a month, however, Lockheed Martin will continue to sample Mountain View #2 on a twice monthly schedule in accordance with the DHS-approved perchlorate blending plan for continued use of this well.

Twice-monthly sampling for perchlorate will continue for Gage 29-2, Gage 29-3, Gage 51-1, and COLL Mountain View #2. Twice-monthly sampling will commence in January 2000 for Gage 92-1. At the conclusion of the next three month sampling cycle (March 31, 2000), the perchlorate concentrations in Gage 29-2, Gage 29-3, Gage 51-1, Gage 92-1, and COLL Mountain View #2 will be evaluated to determine the future sampling frequency.

#### CLOSING

HSI GeoTrans greatly appreciates being of continued service to Lockheed Martin Corporation on this project. Should you have any questions or comments, please do not hesitate to call.

Sincerely, **HSI GEOTRANS** 

Boy J. Marroquin

Project Manager

James C. Norman, R.G., C.HG.

**Project Director** 

**TABLES** 

#### TABLE 1

#### KEY PROJECT DATES AND WSCP SAMPLING PROGRAM EVOLUTION

August 2, 1996, the RWQCB – Santa Ana Region requested Lockheed Martin to submit a conceptual Water Supply Contingency Plan.

September 30, 1996, Lockheed Martin submitted the Water Supply Contingency Plan (WSCP) to the RWQCB – Santa Ana Region.

March 6, 1997, the RWQCB conditionally approved the WSCP, which included sampling eight production wells (City of Loma Linda Richardson #1, Richardson #2, Mountain View #1, Mountain View #2, Victoria Farms Mutual Water Company Wells #1 and #3, and Southern California Edison #1 and #2).

June 1997, Victoria Farms Mutual Water Company was connected to City of San Bernardino Water. Pumping ceased at VFMWC #1 and #3, and the two wells were removed from the program.

June 1997, sampling of SCE #1 was discontinued because it is not operated on a regular basis. The WSCP consists of five wells, including COLL Mountain View #1 and #2, COLL Richardson #1 and #2, and SCE #2 (AUX).

August 1997, the WSCP was expanded due to the detection of perchlorate in municipal supply wells in the Bunker Hill Basin. Twenty-six wells were added to the WSCP including nineteen City of Riverside wells, five City of Redlands wells, and two Loma Linda University wells, for a total of 31 wells.

October 1997, three City of Riverside water system sampling points were added to the WSCP, including the Gage system pipeline (Gage Delivery), the Waterman system pipeline (Iowa Booster), and the sampling station measuring outflow from the Linden and Evans Reservoirs (7<sup>th</sup> & Chicago).

March 1998, two City of Loma Linda water system sampling points were added to the WSCP, including the Mountain View system pipeline (Mountain View Blend at Lawton) and the Richardson system pipeline (Richardson Blend).

June 1998, one City of Riverside irrigation water system sampling point (Gage Arlington) and one additional City of Loma Linda water system sampling point (Mountain View Blend at Timoteo) were added to the WSCP.

December 1998, the COLL Richardson #3 well was added to the WSCP Sampling Program.

May 1999, Sampling of Mountain View Blend at Timoteo was discontinued because it does not represent a blend sample of the Mountain View pipeline system.

December 1999, the COLL Mountain View #3 well and the Gage 98-1 well were added to the WSCP Sampling Program.

TABLE 2
WSCP PRODUCTION WELL SAMPLING PROGRAM

HSI#	Well Name	Perchlorate	TCE	
	Linda	The State of the S	KIRTON S	
	Mountain View #2	X	X	
3106	Mountain View #3	X	X	
693	Richardson #1	X	X	
694	Richardson #2	X	X	
707	Richardson #3	X	X	
City of Loma	Linda Water System Sampling Poin	ts The Action		
2967	Mountain View Blend - Lawton	X	X	
2968	Richardson Blend	X	X	
Southern Cal	fornia Edison			
554	SCE#2(AUX)	X	X	
Loma Linda (	Jniversity			
	LLUniv Anderson #2	X		
717	LLUniv Anderson #3	X		
	ide (Gage System)			
252	Gage#26-1	X	X	
258	Gage#27-1	Х	X	
259	Gage#27-2	X	X	
260	Gage#29-1	X	X	
219	Gage#29-2	X	X	
220	Gage#29-3	X	X	
218	Gage#30-1	X	$\frac{\hat{x}}{x}$	
214	Gage#31-1	X	X	
215	Gage#46-1	X	X	
253	Gage#51-1	X	X	
216	Gage#56-1	X	X	
257	Gage#66-1	<del>X</del>	X	
644	Gage#92-1	X	X	
641	Gage#92-2	X	X	
642	Gage#92-3	X	X	
3091	Gage#98-1	X	$\frac{\hat{x}}{\hat{x}}$	
· · · · · · · · · · · · · · · · · · ·				
	Hunt#6	X	The state of the s	
271	Hunt#10	X		
272	Hunt#10	X		
2946	ide Water System Sampling Points Iowa Booster (Waterman)	X		
			X	
2947	Gage Delivery (Gage)	X	X	
2948	7th & Chicago (Reservoir)	X		
3018	Gage Arlington		The second secon	
			THE RESERVE AND A SHARE A SHAR	
542	COR Church St	X		
2673	COR#38	X		
535	COR Mentone Acres	X		
29	COR Orange st	X		
74	CORRees	X	X	

Notes:

TCE = Trichloroethene

Perchlorate analyzed using DHS Method (EPA 300.0 Modified)

TCE analyzed using EPA Method 502.2

TABLE 3

### WSCP PRODUCTION WELL SAMPLING PROGRAM DECEMBER 1999 WELLS SAMPLED TWICE MONTHLY

HSI#	Well Name	Perchlorate	TCE
City of Loma Linda	one of the state o		
692	Mountain View #2	×	
City of Riverside (Gage System)		The second second	
219	Gage #29-2	×	X
220	Gage #29-3	x	X
253	Gage #51-1	×	

#### Notes:

TCE = Trichloroethene

Perchlorate analyzed using DHS Method (EPA 300.0 Modified).

TCE analyzed using EPA Method 502.2.

## TABLE 4 WSCP PRODUCTION WELL SAMPLING PROGRAM DECMEMBER 1999 DATA RESULTS

ĤSI#	Well Name	Sample Date	Perchlorate (µg/L) Del Mar	TCE (µg/L) Del Mar
		HERELITAL STATES		
692	Mountain View #2	12/1/99	10	0.59
692	MUN-764	12/1/99	11	0.52
692	Mountain View #2*	12/13/99	8.6	NA NA
692	MUN-766	12/13/99	8.8	NA NA
3106	Mountain View #3	12/10/99	ND(4)	ND(0.5)
693	Richardson #1	NS	NS NS	NS NS
694	Richardson #2	12/1/99	42 <sup>c</sup>	3.2 <sup>c</sup>
707	Richardson #3	12/1/99	ND(4)	ND(0.5)
City of Loma Line	la Water System Sampling Points			
	Mountain View Blend-Lawton	12/1/99	7.0	ND(0.5)
2968	Richardson Blend	NS	NS	NS NS
	ower (Formerly Southern California			
554	SCE#2(AUX) ersity	12/1/99	ND(4)	ND(0.5)
Loma Linda Univ	ersity			
267 717	LLUniv Anderson #2	12/1/99 12/1/99	5.7 4.4	NA NA
	LLUniv Anderson #3		4.4 4.2023 4.2030 (2.20)	
City of Riverside			<del></del>	
252	Gage#26-1 <sup>b</sup>	12/2/99	10	7.1
258	Gage#27-1 <sup>b</sup>	12/2/99	6.9	5.6
259	Gage#27-2	NS	NS	NS
260	Gage#29-1	12/2/99	8.4	ND(0.5)
219	Gage#29-2	NS	NS	NS
219	Gage 29-2*	NS	NS	NS
220	Gage#29-3	NS	NS	NS
220	Gage#29-3*	NS	NS	NS
218	Gage#30-1	NS	NS	NS
214	Gage#31-1	NS	NS	NS
215	Gage#46-1	NS	NS	NS
253	Gage#51-1	NS	NS	NS
253	Gage#51-1*	NS	NS	NA NA
216	Gage#56-1	NS	NS	NS
257	Gage#66-1	12/2/99	10	ND(0.5)
644	Gage#92-1	12/2/99	15	0.91
644	MUN-765	12/2/99	15	0.87
644	Gage#92-1**	12/20/99	16	NA NA
641	Gage#92-2	12/2/99	ND(4)	ND(0.5)
642 3091	Gage#92-3	12/2/99	ND(4)	ND(0.5)
	Gage#98-1	12/13/99	ND(4)	ND(0.5)
	(Waterman System)			
273	Hunt#6 Hunt#10	NS NS	NS NS	NA NA
271		NS NS	NS NS	
272	Hunt#11		<del></del>	NA NA
2946	Water System Sampling Points			**************************************
2946	Iowa Booster (Waterman)	12/2/99 12/2/99	ND(4) 4.5	ND(0.5) ND(0.5)
2947	Gage Delivery (Gage) 7th & Chicago (Reservoir)	12/2/99		
3018	Gage Arlington	12/2/99	ND(4) 6.8	ND(0.5) NA
City of Redlands	Gage Anington			
	,			
542	COR Church St <sup>a</sup>	NS I	NS	NA NA
2673	COR#38 <sup>a</sup>	NS	NS	NA NA
535	COR Mentone Acres <sup>a</sup>	NS	NS	NA NA
29	COR Orange St <sup>a</sup>	NS	NS	NS
74	COR Rees	12/1/99	5.2	ND(0.5)

#### Notes:

= Twice-monthly sampling result

\*\* = Confirmation sampling results

ND(4) = Not detected at the specified limit

MUN = Duplicate sample collected from the well listed directly above

NA = Not Analyzed
NS = Not Sampled

TCE = Trichloroethene

Perchlorate analyzed using DHS Method (EPA 300.0 Modified) TCE analyzed using EPA Method 502.2

- = Well sampled on quarterly basis, if active
  - = Gage 26-1 and Gage 27-1 are currently being treated for TCE
- = Water purged to waste and not into system

TABLE 5

#### SUMMARY OF WATER LEVEL MEASUREMENTS DECEMBER 1999 SAMPLING EVENT

HSI#	Well Name	Measure Date	Depth to Water	Measuring Point Elevation	Groundwater Elevation	Comments
	OMA LINDA					
692	Mountain View #2	12/06/99	167	1085	918	Static
3106	Mountain View #2	12/06/99	100	1086	986	Static
693	Richardson #1	12/06/99	150	1077	927	Static
694	Richardson #2	12/06/99	140	1078	938	Static
707	Richardson #3	12/06/99	166	NA NA	NA NA	Static
	California Edison	12/00/00				
554	SCE#2(AUX)	NM	NM	1100.00	NM	Pumping
267	LLUniv Anderson #2	NM	NM	1075	NM	Pumping
717	LLUniv Anderson #3	NM	NM	1070	NM	Pumping
1	erside (Gage System)				1 11V1	Tumping
252	Gage#26-1	12/01/99	96.20	1045.33	949.13	Pumping
258	Gage#27-1	12/01/99	90.00	1044.64	954.64	Pumping
259	Gage#27-2	12/01/99	73.90	1044.64	970.74	Static
260	Gage#29-1	12/01/99	76.00	1044.43	968.43	Static
219	Gage#29-2	12/01/99	67.20	1046.31	979.11	Static
220	Gage#29-3	12/01/99	67.50	1048.75	981.25	Static
218	Gage#30-1	12/01/99	104.10	1054.17	950.07	Static
214	Gage#31-1	12/01/99	70.50	1054.64	984.14	Static
215	Gage#46-1	12/01/99	75.50	1065.50	990.00	Static
253	Gage#51-1	12/01/99	94.60	1044.64	950.04	Static
216	Gage#56-1	12/01/99	161.00	1065.50	904.50	Pumping
257	Gage#66-1	12/01/99	121.70	1044.85	923.15	Pumping
644	Gage#92-1	12/01/99	168.70	1047.78	879.08	Pumping
641	Gage#92-2	12/01/99	186.70	1053.38	866.68	Pumping
642	Gage#92-3	12/01/99	180.90	1058.78	877.88	Pumping
3091	Gage#98-1	12/01/99	166.90	1058.78	891.88	Pumping
City of Rive	erside (Waterman System		12. The Marian		W. W. W. W. Linds	
273	Hunt#6	NM	NM	1015.5	NM	Pumping
271	Hunt#10	NM	NM	1017	NM	Pumping
272	Hunt#11	NM	NM	1015.7	NM	Pumping
City of Rec	dlands	og istrebti		7. T. A. P. B. B. B. C. C. C.		
542	COR Church St	Dec-99	114.0	1344.8	1230.8	Static
2673	COR#38	Dec-99	102.0	NA	NA	Pumping
535	COR Mentone Acres	Dec-99	225.0	1506.4	1281.4	Static
29	COR Orange st	Dec-99	119.0	1282	1163.0	Static
74	COR Rees	Dec-99	236.0	1490	1254.0	Pumping

#### Notes:

All measurements reported in feet below measuring point (ft-bmp)

Water level measurements for all City of Loma Linda, City of Riverside, and City of Redlands wells were obtained by purveyor personnel.

Elevations given in feet above mean sea level (ft-msl)

NM=Not measured

NA=Data not available

Static water levels were allowed to recover a minimum of 30 minutes to obtain a static water level measurement

#### **TABLE 6**

# TWICE MONTHLY EVALUATION THREE MONTH DATA AND AVERAGE CONCENTRATIONS

#### **PERCHLORATE**

- Well Name	Sample Date	Sample Result	75% of PAL	PAL			
Gage29-2	10/15/99	20	13.5	18			
Average 10/1/99 - 12/31/99*	The second secon	20	generalization of the state of	en regen wer in define in general gewan. The transfer of the t			
Gage51-1	10/1/99	13	13.5	18			
Gage51-1	10/15/99	15	13.5	18			
Gage51-1	11/3/99	16	13.5	18			
Average 10/1/99 - 12/31/99*							
COLL Mountain View #2	10/4/99	11.0	13.5	18			
COLL Mountain View #2	10/18/99	7.8	13.5	18			
COLL Mountain View #2	11/8/99	8.8	13.5	18			
COLL Mountain View #2	11/17/99	7.8	13.5	18			
COLL Mountain View #2	12/1/99	10	13.5	18			
COLL Mountain View #2	12/13/99	8.6	13.5	18			
Average 10/1/99 - 12/31/99		9.0					

#### **TRICHLOROETHENE**

Well Name	Sample Date	Sample Result	2/5 of MCL	MCL	
Gage29-2	10/15/99	4.0	2	5	
Average 10/1/99 - 12/31/99*					

#### Notes:

\* Well sometimes off-line between 10/1/99 - 12/31/99

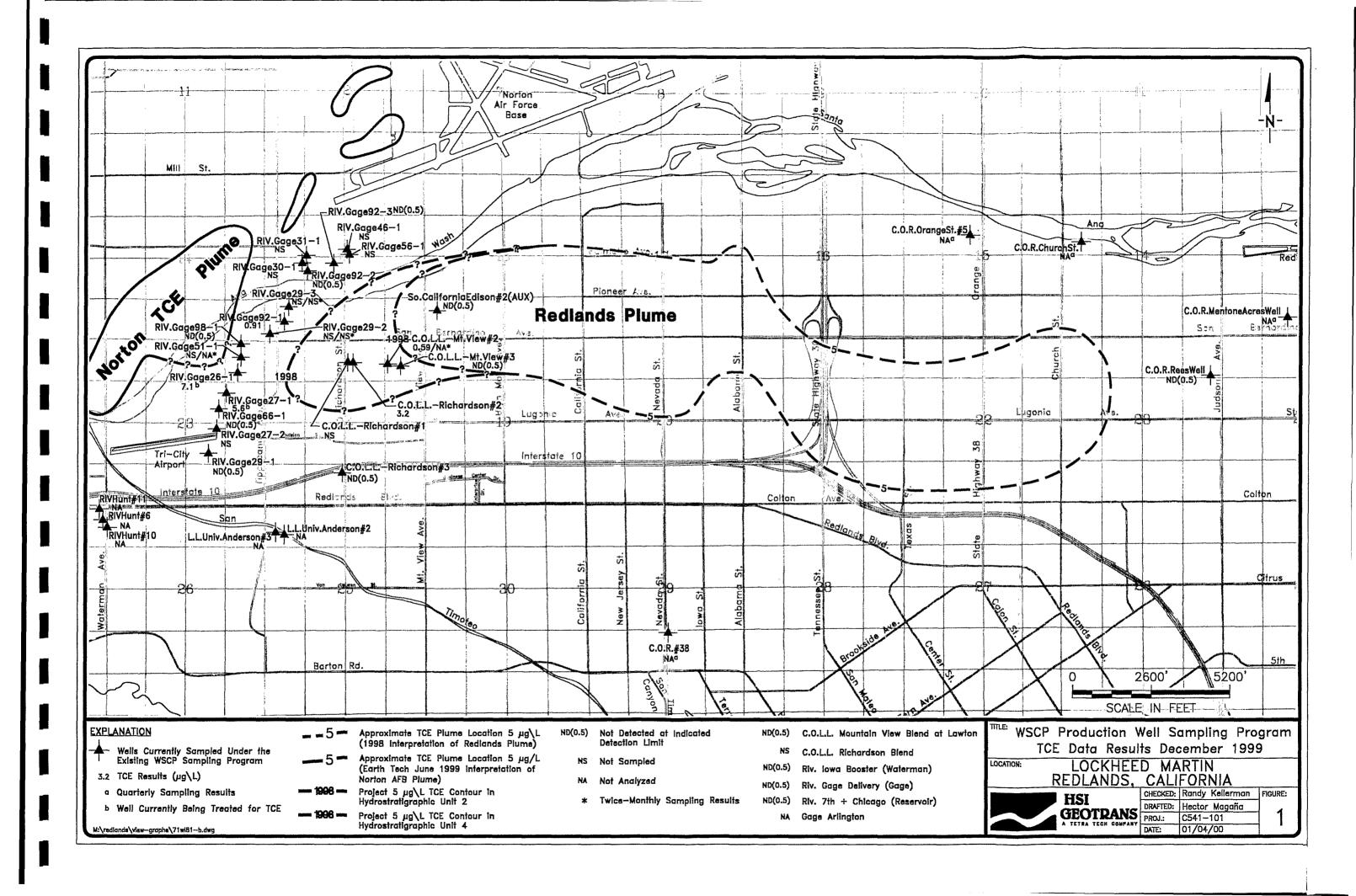
Gage 29-3 was offline during all sampling events between 10/1/99 - 12/31/99

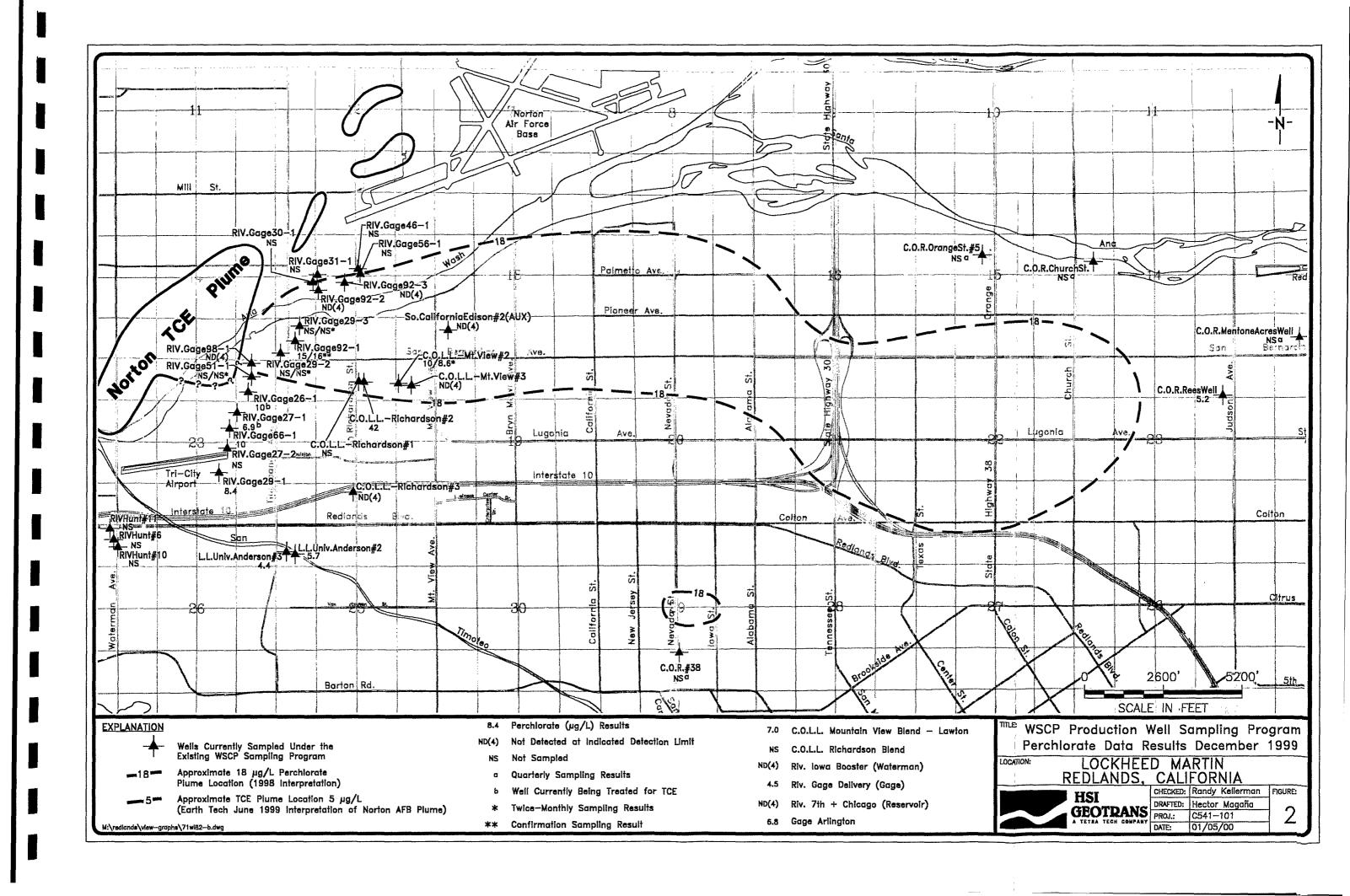
All concentrations are micrograms per liter.

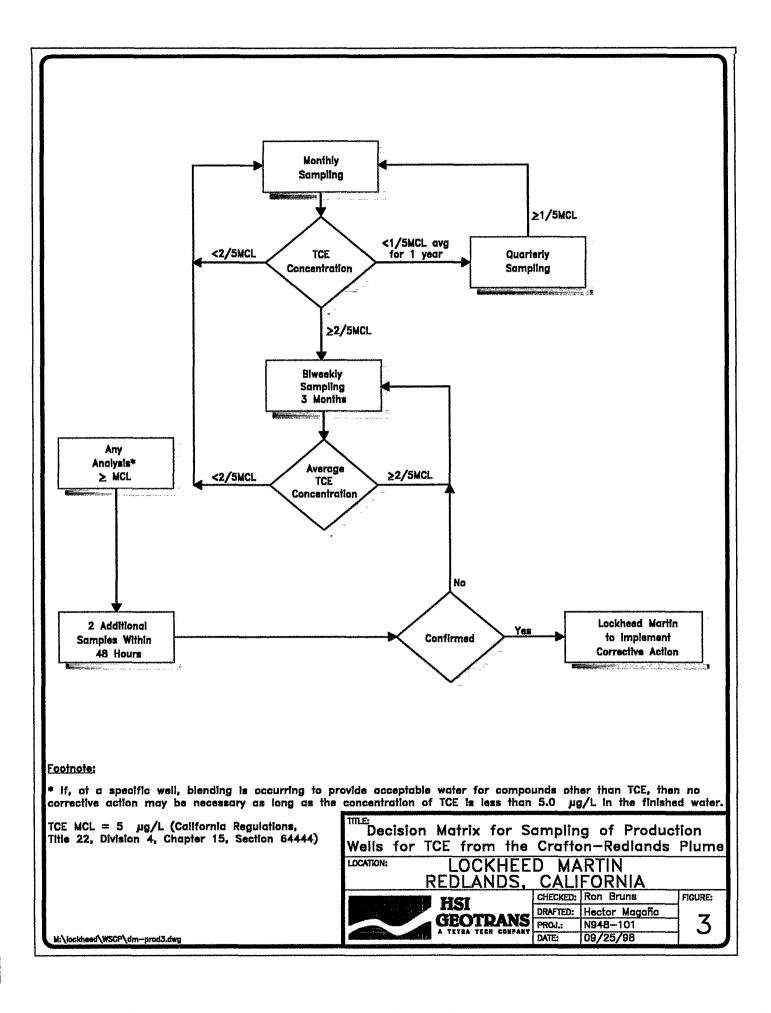
MCL = Maximum Contaminant Level

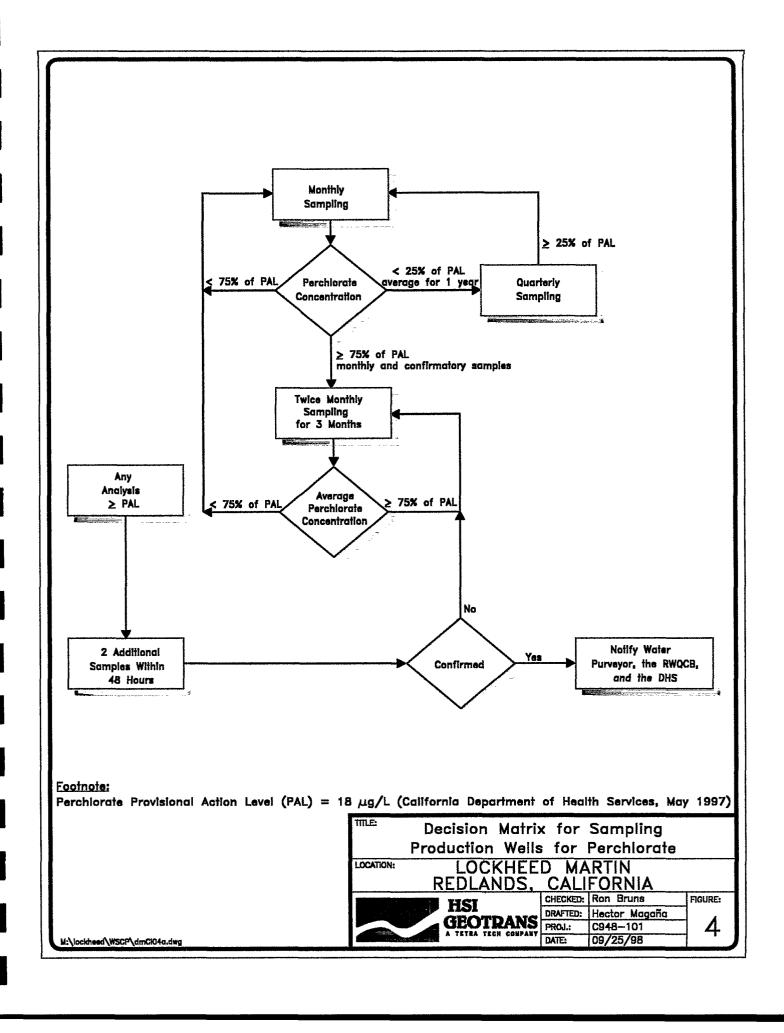
PAL = Provisional Action Level for perchlorate

**FIGURES** 









ATTACHMENT A
GEOLIS FIELD FORMS

ATTACHMENT A

GEOLIS FIELD FORMS (Available Upon Request)

#### **ATTACHMENT B**

CHAIN-OF-CUSTODY RECORDS AND
LABORATORY DATA SHEETS
QUALITY ASSURANCE/QUALITY CONTROL DOCUMENTATION

#### **ATTACHMENT B**

CHAIN-OF-CUSTODY RECORDS AND
LABORATORY DATA SHEETS AND LEVEL III MODIFIED
QUALITY ASSURANCE/QUALITY CONTROL DOCUMENTATION
(Available Upon Request)